Complete Summary

GUIDELINE TITLE

Blood transfusion: indications and administration.

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Blood transfusion: indications and administration. In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2006 Aug 8 [Various].

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Symptomatic chronic anaemia or acute bleeding

GUIDELINE CATEGORY

Treatment

CLINICAL SPECIALTY

Family Practice
Hematology
Internal Medicine
Pathology

INTENDED USERS

Clinical Laboratory Personnel
Health Care Providers
Physicians

GUIDELINE OBJECTIVE(S)

Evidence-Based Medicine Guidelines collects, summarizes, and updates the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.

TARGET POPULATION

Patients in primary care settings who have symptomatic chronic anaemia or acute bleeding

INTERVENTIONS AND PRACTICES CONSIDERED

1. Red blood cell transfusion in treatment-resistant, slowly developing anaemia transfusion
2. Treatment of acute bleeding
    - Volume replacement (e.g., physiological saline)
    - Referral if bleeding does not stop
3. Blood products in special cases
    - Washed cell products
    - Immunoglobulin A (IgA)-deficient fresh frozen plasma
    - Irradiated blood cell products
    - Phenotyped red blood cells
    - Platelets
4. Techniques of transfusion of blood products
    - Collection of blood for grouping and compatibility testing (cross matching)
    - Checking procedure prior to transfusion
    - Administration of blood transfusion including:
        - Administer within 6 hours of removal of unit from refrigerator
        - Do not re-refrigerate after 2 hours at room temperature
        - Check vital signs prior to infusion
        - Use blood products that are at room temperature
        - Use warmed products if patient has significant cold agglutinins
        - Use a blood administration set
        - Perform biological pre-check and monitor throughout the entire transfusion
        - Transfuse one unit no longer than 6 hours
        - Use same administration set to transfuse several units but change after 6 hours
        - Use special platelet administration set to administer platelets
        - Document transfusion

Note: Guideline developers considered but did not specifically recommend albumin administration, cell savage, and leukofiltration

MAJOR OUTCOMES CONSIDERED

Safety and adverse effects of blood transfusions

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The evidence reviewed was collected from the Cochrane database of systematic reviews and the Database of Abstracts of Reviews of Effectiveness (DARE). In addition, the Cochrane Library and medical journals were searched specifically for original publications.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
B. Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.
C. Limited research-based evidence. At least one adequate scientific study.
D. No research-based evidence. Expert panel evaluation of other information.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

The levels of evidence [A-D] supporting the recommendations are defined at the end of the "Major Recommendations" field.

In General

- In primary care, a blood transfusion is usually only administered in the treatment of symptomatic chronic anaemia where no specific treatment is available.
- It may also be necessary to use various blood products in cases of acute bleeding.

Indications for a Blood Transfusion

Red Blood Cell Transfusion in Treatment-Resistant, Slowly Developing Anaemia

- It is not possible to give an exact haemoglobin (Hb) value below which a red blood cell infusion is indicated since the need for a transfusion is based on the patient's underlying illnesses and symptoms.
- Most patients will suffer uncomfortable symptoms if the concentration of Hb falls below 7 g/dl (70 g/l).

- A less significant fall in the Hb concentration will cause symptoms in patients with heart or pulmonary disease. An Hb concentration of 10 g/dl (100 g/l) is usually needed to safeguard an adequate oxygen transport.
- Transfusions are not routinely recommended for the correction of anaemia in patients with malignant disease or serious chronic disease unless the correction of Hb concentration is expected to significantly improve the patient's condition and independence.

Treatment of Acute Bleeding

- Volume replacement is the most important first aid measure in acute bleeding. This can be achieved, for example, with physiological saline.
- The general condition of the patient and his/her underlying illnesses should be taken into account when assessing the need for red blood cell transfusion. The Hb concentration is only one of many criteria when assessing the extent of the bleed.
- In patients with ischaemic heart disease, an acutely reduced oxygen-carrying capacity may increase the risk of myocardial infarction.
- If it is not possible to stop the bleeding and an immediate red blood cell transfusion is indicated, the patient must be referred to a hospital with facilities to locate the bleeding point and arrest the bleeding. In such a case, it may also be necessary to administer platelets and clotting factors.

Choosing a Blood Product in Special Cases

- All blood products are now filtered; (i.e. they are leukocyte-depleted.)
- Washed cell products (platelets and red blood cells) are used in patients with confirmed deficiency of immunoglobulin A (IgA) (serum IgA < 0.05 mg/l). IgA-deficient fresh frozen plasma is also available (IgA-deficient donor). Leukocyte-depleted blood cell products may still cause serious febrile and urticarial reactions and the use of washed blood cell products will reduce their incidence.
- Irradiated blood cell products are used to prevent graft-versus-host reactions in immunosuppressed patients (e.g. after stem cell or bone marrow transplantation and in small premature babies).
- Phenotyped red blood cells are used in patients who have developed clinically significant antibodies against red cells as a result of previous transfusions or pregnancies.
- Platelets that are compatible with the patient's tissue type are also available. These are either HLA (human leukocyte antigen) or HPA (human platelet antigen) matched platelets, and they are used in patients who have developed HLA and/or HPA antibodies as a result of previous transfusions or pregnancies, and who are refractory to conventional platelet products.

Transfusion of Blood Products (Red Blood Cells, Platelets and Fresh Frozen Plasma)

The Collection of Blood for Grouping and Compatibility Testing (Cross Matching)

- Verify the identity of the patient. Ask the patient to state his/her own identification details and, if necessary, check them against the patient's identity wrist band.
- With the exception of an emergency transfusion, the collection of a blood sample for blood grouping and red cell antibody screening and the collection of a second sample for blood group checking and compatibility testing should be taken at different times by two different people.
    - The transfusion of fresh frozen plasma or platelets does not require compatibility testing, but the blood group of the patient should be confirmed.
- The blood samples should be stored in a refrigerator; the samples will remain suitable for compatibility testing for up to five days from the time of collection.

Checking Procedure Prior to Transfusion

- Verify the identity of the patient.
- Ensure that the product is suitable and intended for the patient.
    1. The patient's identification details must match with the identification details of the laboratory form.
    2. The blood group of the product to be transfused must correspond with the patient's blood group.
    3. Before a transfusion of red blood cells, check the result of the compatibility testing and verify that the correct product and patient was used for the test (i.e. the numbers on the red blood cell unit and its compatibility test tubing correspond to the numbers on the compatibility form issued by the laboratory.
- If the patient has red cell antibodies, ensure that the label on the red blood cell unit states the absence of the antigens corresponding to the antibodies detected in the patient.
- Examine the blood product carefully.

    1. The integrity and cleanliness of the container.
    2. If you suspect haemolysis, check whether the plasma in the compatibility test tubing is red.
    3. The presence of clots, gas or a violet colour of a red blood cell product are suggestive of bacterial contamination, as is the cessation of platelet swirling when inspecting platelet products against light ("angel curls").
- Confirm that the checks have been carried out by signing the transfusion form.

Administration of a Blood Transfusion

- A transfusion of red blood cells should commence within six hours of removal of the unit from a refrigerator.
- If a red blood cell product has been at room temperature for two hours, it must not be returned to a refrigerator for storage but it must either be transfused (see above) or discarded.
- Before starting a transfusion check the patient's vital signs (i.e. blood pressure, pulse and temperature).
- Blood products should be at room temperature before transfusion.

- If the patient has significant cold agglutinins, red blood cell products should be warmed during transfusion with an approved commercial blood warmer. The temperature must not exceed +37 degree C due to the risk of haemolysis.
- A blood administration set with a 200 µm filter should be used to transfuse all blood products (red blood cells, platelets, fresh frozen plasma).
- A biological pre-check is recommended at the beginning of a red blood cell transfusion; the red cells are transfused slowly (10 to 15 drops/min) during the first 10 minutes whilst carefully observing the patient. The patient must then be monitored throughout the entire transfusion. Procedure in suspected adverse reaction to the transfusion, see the Finnish Medical Society Duodecim guideline "Adverse Effects of a Blood Transfusion and Administration of a Wrong Blood Product"
- A transfusion of a unit of red blood cells should not last longer than six hours.
- The same administration set may be used to transfuse several units of red blood cells without interruption (according to the capacity of the administration set filter), but it is recommended that the administration set is changed after six hours in order to reduce the risk of bacterial contamination.
- It is recommended that platelets are administered via a special platelet administration set.
- Record the start and end time of the blood product transfusion in the patient's notes and confirm the completion of transfusion with your signature. This will ensure the blood product may be traced back from the patient to the donor and vice versa.

Related Evidence

- There is no evidence that albumin administration would be beneficial for critically ill patients (hypovolaemia, burns, hypoalbuminaemia) and it may increase the risk of death (The Albumin Reviewers, 2004) [**B**].
- The risk of post-operative infections may be increased two-fold if allogeneic blood is transfused rather than autologous blood (Duffy & Neal, 1996) [**C**].
- Cell salvage appears to be effective in reducing the need for allogeneic red cell transfusion in adult elective surgery (Carless et al., 2006) [**B**].
- Leukofiltration appears to prevent most febrile reactions to red blood cell transfusions, reduce the risk of cytomegalovirus transmission, and lower the incidence of alloimmunisation (Gibis & Baladi, 1998) [**B**].

Definitions:

Levels of Evidence

A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
B. Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.
C. Limited research-based evidence. At least one adequate scientific study.
D. No research-based evidence. Expert panel evaluation of other information.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Concise summaries of scientific evidence attached to the individual guidelines are the unique feature of the Evidence-Based Medicine Guidelines. The evidence summaries allow the clinician to judge how well-founded the treatment recommendations are. The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate selection and administration of blood products in blood transfusions for patients with symptomatic chronic anemia or acute bleeding

POTENTIAL HARMS

The risk of post-operative infections may be increased two-fold if allogeneic blood is transfused rather than autologous blood.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Blood transfusion: indications and administration. In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2006 Aug 8 [Various].

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2000 Mar 30 (revised 2006 Aug 8)

GUIDELINE DEVELOPER(S)

Finnish Medical Society Duodecim - Professional Association

SOURCE(S) OF FUNDING

Finnish Medical Society Duodecim

GUIDELINE COMMITTEE

Editorial Team of EBM Guidelines

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Author: Sinikka Koskinen

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

GUIDELINE AVAILABILITY

This guideline is included in "EBM Guidelines. Evidence-Based Medicine" available from Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 17, 2002. The information was verified by the guideline developer as of February 7, 2003. This summary was updated by ECRI on July 15, 2004 and on December 21, 2006.

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